Carnegie Mellon
Software Engineering Institute

Process Maturity Profile

Software CMM®
2005 End-Year Update

March 2006

We could not produce this report without the support of the organizations and lead appraisers who reported their appraisal results to the SEI^{SM}.

Our many thanks for their continuing cooperation with our data collection and analysis efforts.

CMMI Appraisal Program

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Thanks for Reporting your Appraisal Results to the SEI

The briefing is only possible due to the cooperation of organizations and individuals sending in their appraisal results to the SEI

Our many thanks for their cooperation with our data collection and analysis efforts.

The SW-CMM appraisals sunset is Dec. 2005. There will be no more update available in the future.

Outline

Introduction

Current Status

Community Trends

Organizational Trends

Summary

This briefing is based solely on the appraisals reported to the SEI. It cannot be used as a source for an exact indicator of all organizations in the world using SEI models or appraisal methods nor can it be used for certification or verification purposes.

The SEI does not certify organizations. The SEI only licenses SEI partners and SEI authorized lead assessors to conduct appraisals. Neither the SEI nor any other organization is a "certifying authority" of the results from an appraisal. Therefore requests to the SEI to provide information to be used for this purpose can not be fulfilled. Information provided by the SEI, such as this briefing, is to demonstrate use of its products and services only.

Organizations performing source selection or verification should consider performing an evaluation appraisal. For more information on appraisal methods and for a directory of authorized lead appraisers who can perform them, visit:
http://www.sei.cmu.edu/appraisal-program/

Introduction - 1: Purpose and Source

Characterize the process maturity of the software community

This briefing uses information from appraisals using the SW-CMM in:

- **CMM®-Based Appraisals for Internal Process Improvement (CBA IPIs) and**

- **Software Process Assessments (SPAs) and**

- **Standard CMMI® Appraisal Method for Process Improvement (SCAMPISM), v1.1**

Please visit:

http://www.sei.cmu.edu/appraisal-program/profile/about.html

for additional information or to answer questions you may have about this briefing

Introduction - 2: Briefing Contents

This briefing includes three primary sections:

1. Current Status
- **Snapshot of the software community based on the most recent appraisal, since 2001, of reporting organizations**

2. Community Trends
- **Global distribution of appraisals**
- **Growth in the number of appraisals performed**
- **Shifts in the maturity profile over time**

3. Organizational Trends
- **Analysis of Key Process Area (KPA) satisfaction**
- **Time to move up in maturity based on change in maturity level and time between appraisals**

Section 1: Current Status

Appraisals conducted from 2001 through December 2005 and reported to the SEI

- **1,804   organizations**
- **   996   participating companies**
- **8,897   projects**
- **66.6%   Non-USA organizations**

Please refer to: Terms Used in this Report on page 30

Maturity Profile
by All Reporting Organizations
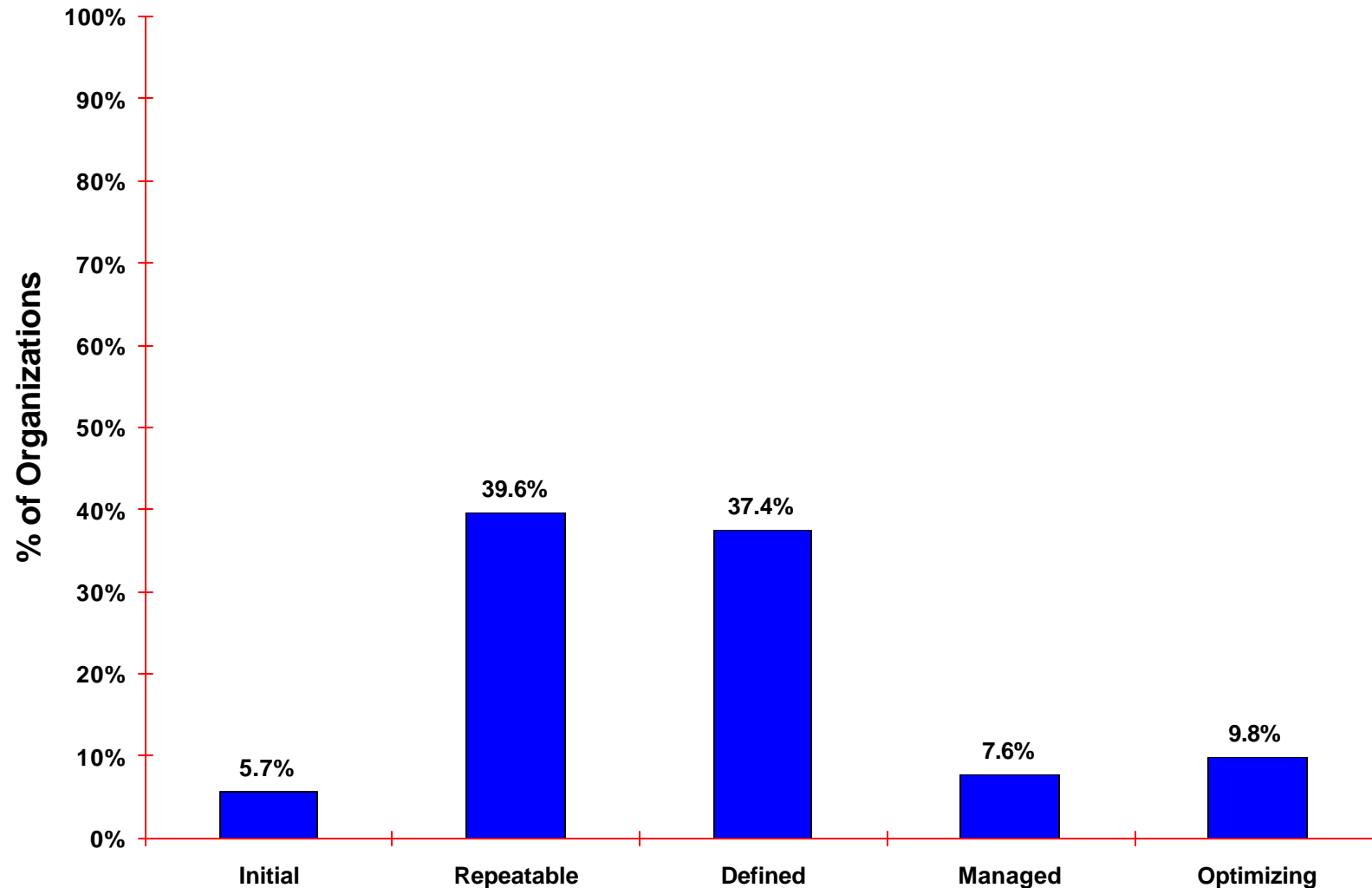
Based on most recent appraisal, since **2001**, of **1,804** organizations reporting a maturity level rating

Reporting Organization Categories

Commercial/In-house — 80.9%

DoD/Fed Contractor — 16.1%

Military/Federal — 3.0%

X-axis: 0%, 10%, 20%, 30%, 40%, 50%, 60%, 70%, 80%, 90%, 100%

% of Organizations

Based on **1,804** organizations reporting organization categories

Maturity Profile
by Reporting Organization Categories
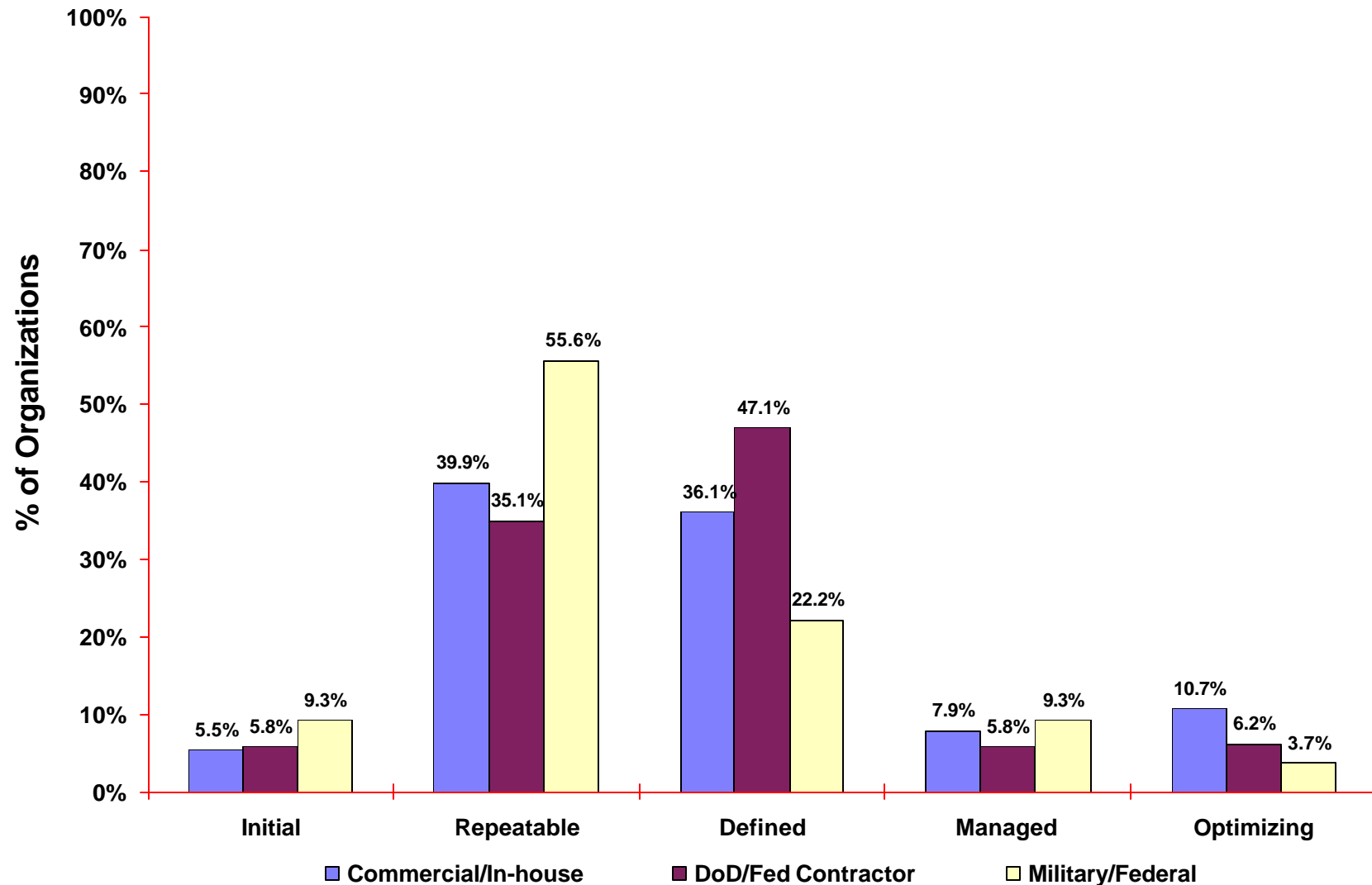
Based on most recent appraisal, since **2001**, of **1,804** organizations reporting categories and a maturity level rating

Organization Type
Based on Primary Standard Industrial Classification (SIC) Code

Wholesale Trade
0.6%

Retail Trade
0.8%

Transportation, Communication, Electric, Gas and Sanitary Services
3.6%

Construction
0.2%

Public Administration (Including Defense)
8.8%

Finance, Insurance and Real Estate
15.1%

Business Services
36.5%

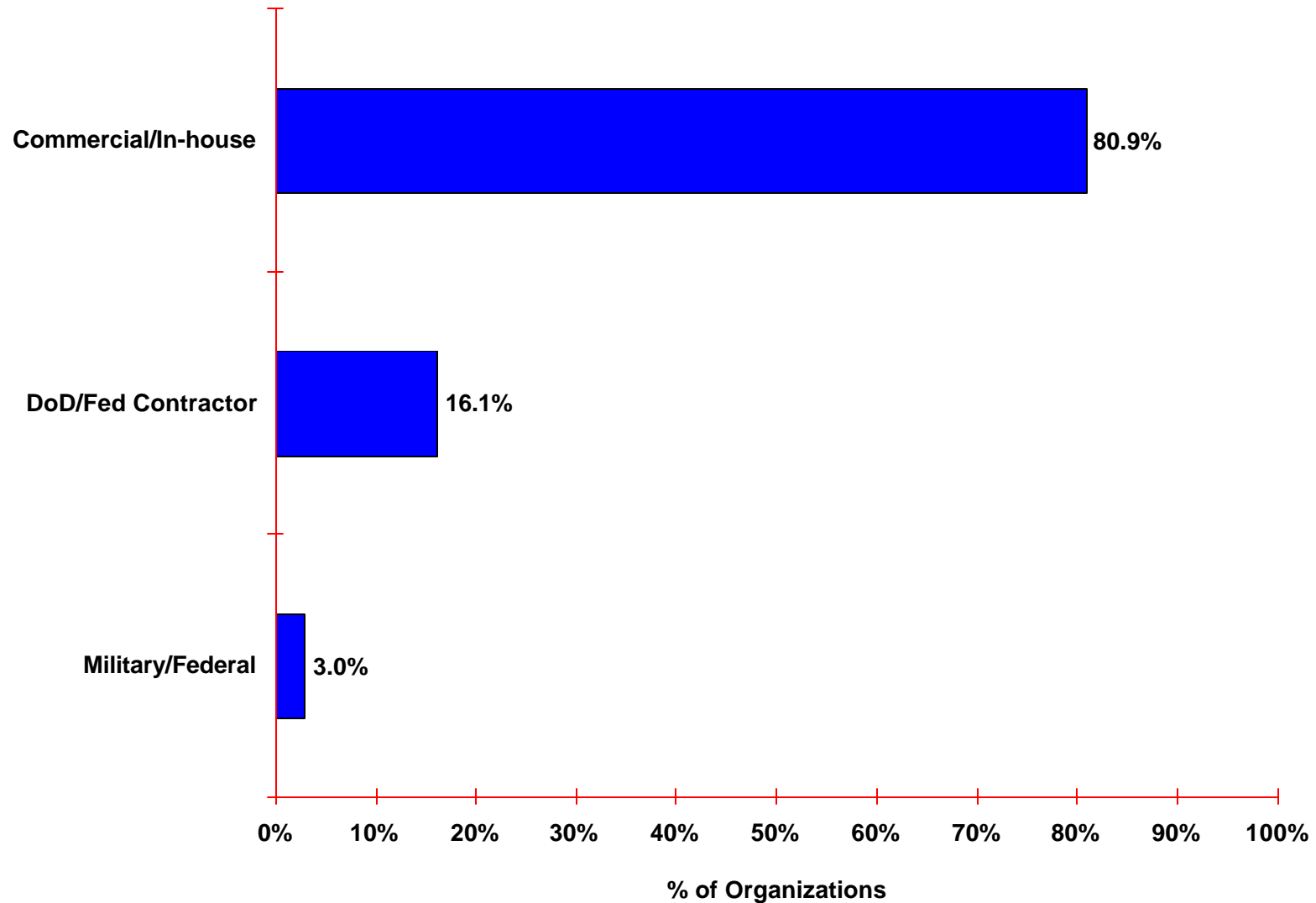**Services 47.2%**

Rubber And Misc Plastics Products
0.2%

Furniture And Fixtures
0.2%

Manufacturing 23.8%

Printing And Publishing
0.3%

Engineering & Management Services
10.0%

Chemicals And Allied Products
0.5%

Fabricated Metal Products
0.5%

Health Services
0.3%

Primary Metal Industries
0.6%

Electronic & Other Electric Equipment
5.3%

Industrial Machinery And Equipment
3.7%

Other Services
0.2%

Amusement & Recreation Services
0.2%

Transportation Equipment
6.5%

Instruments And Related Products
6.0%

Based on **617** organizations reporting SIC code. For more information visit: http://www.osha.gov/oshstats/sicser.html

Organization Size

Based on the total number of employees within the area of the organization that was appraised
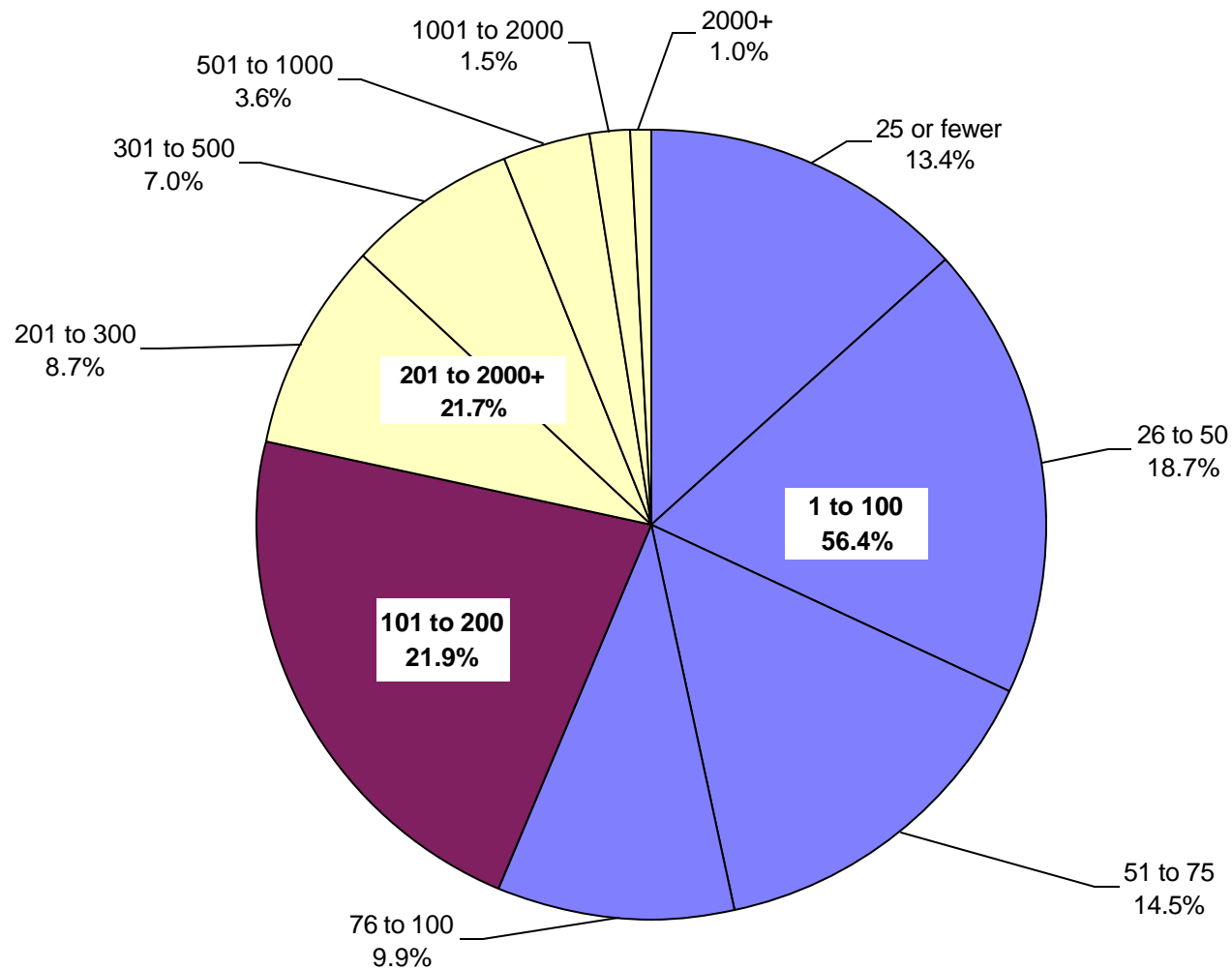
Based on **1,775** organizations reporting size data

Maturity Profile by Organization Size

Based on the total number of employees within the area of the organization that was appraised

The number of organizations for the 2000+ category is small whic h inflates the maturity level bars. Please see page 9 and take this into account. The purpose of this chart is to indicate that all size categories contain most, if not all, maturity levels.

% of Organizations

Category	Initial	Repeatable	Defined	Managed	Optimizing
25 or fewer	8.9%	63.3%	24.9%	0.4%	2.5%
26 to 50	4.5%	50.0%	35.8%	6.3%	3.3%
51 to 75	7.4%	39.7%	37.4%	6.2%	9.3%
76 to 100	4.6%	33.7%	42.3%	9.7%	9.7%
101 to 200	4.6%	33.5%	41.8%	11.3%	8.8%
201 to 300	5.8%	29.7%	36.1%	8.4%	20.0%
301 to 500	5.6%	21.0%	45.2%	8.9%	19.4%
501 to 1000	17.2%	45.3%	12.5%	25.0%	
1001 to 2000	7.7%	23.1%	50.0%	3.8%	15.4%
2000+	5.9%	23.5%	29.4%	11.8%	29.4%

■ Initial ■ Repeatable □ Defined ■ Managed ■ Optimizing

Based on **1,775** organizations reporting size data and a maturity level rating

USA and Non-USA
Reporting Organization Categories
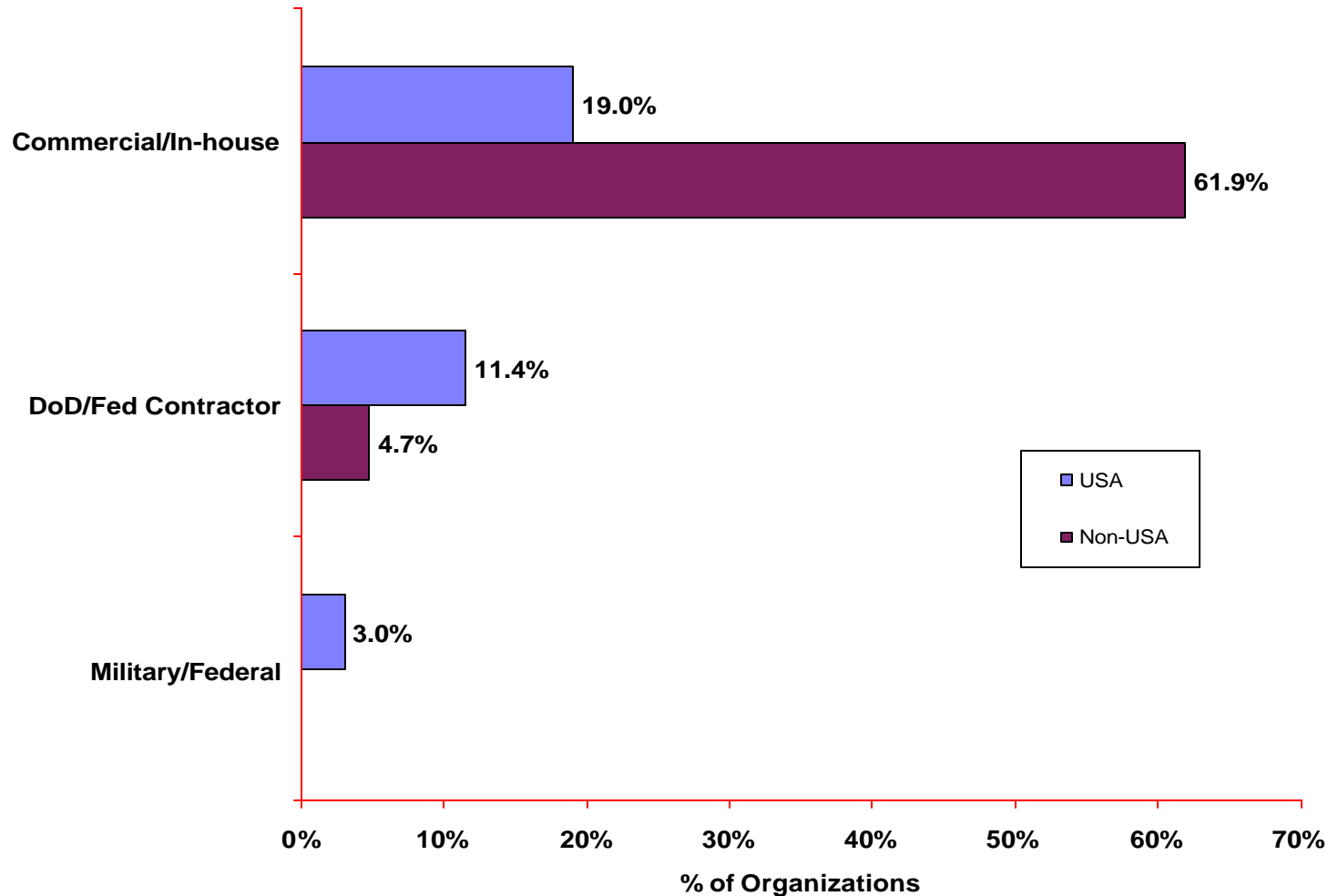
Based on **602** U.S. organizations and **1202** Non-USA organizations reporting organization categories

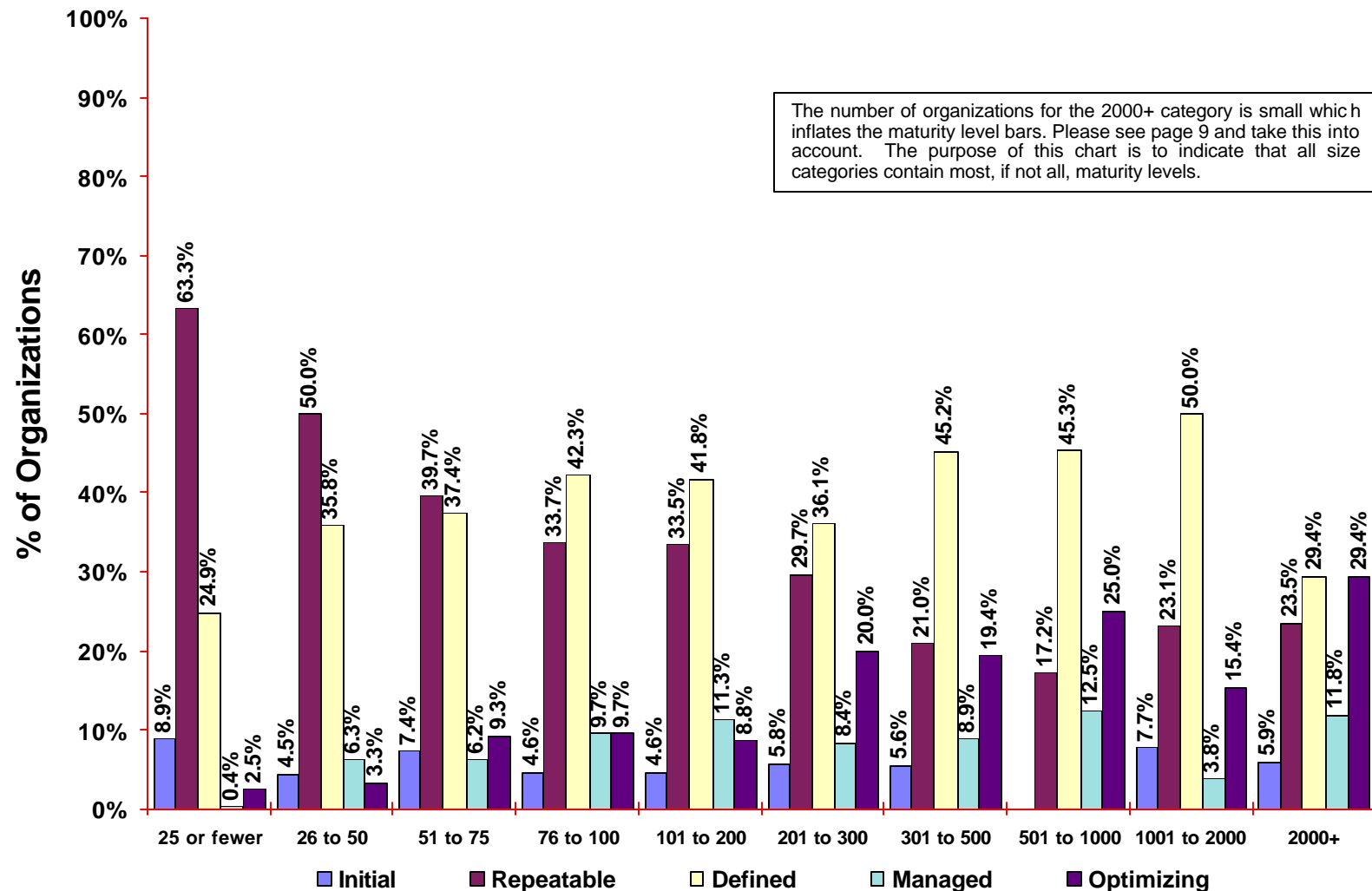# Maturity Profile by All Reporting USA and Non-USA Organizations
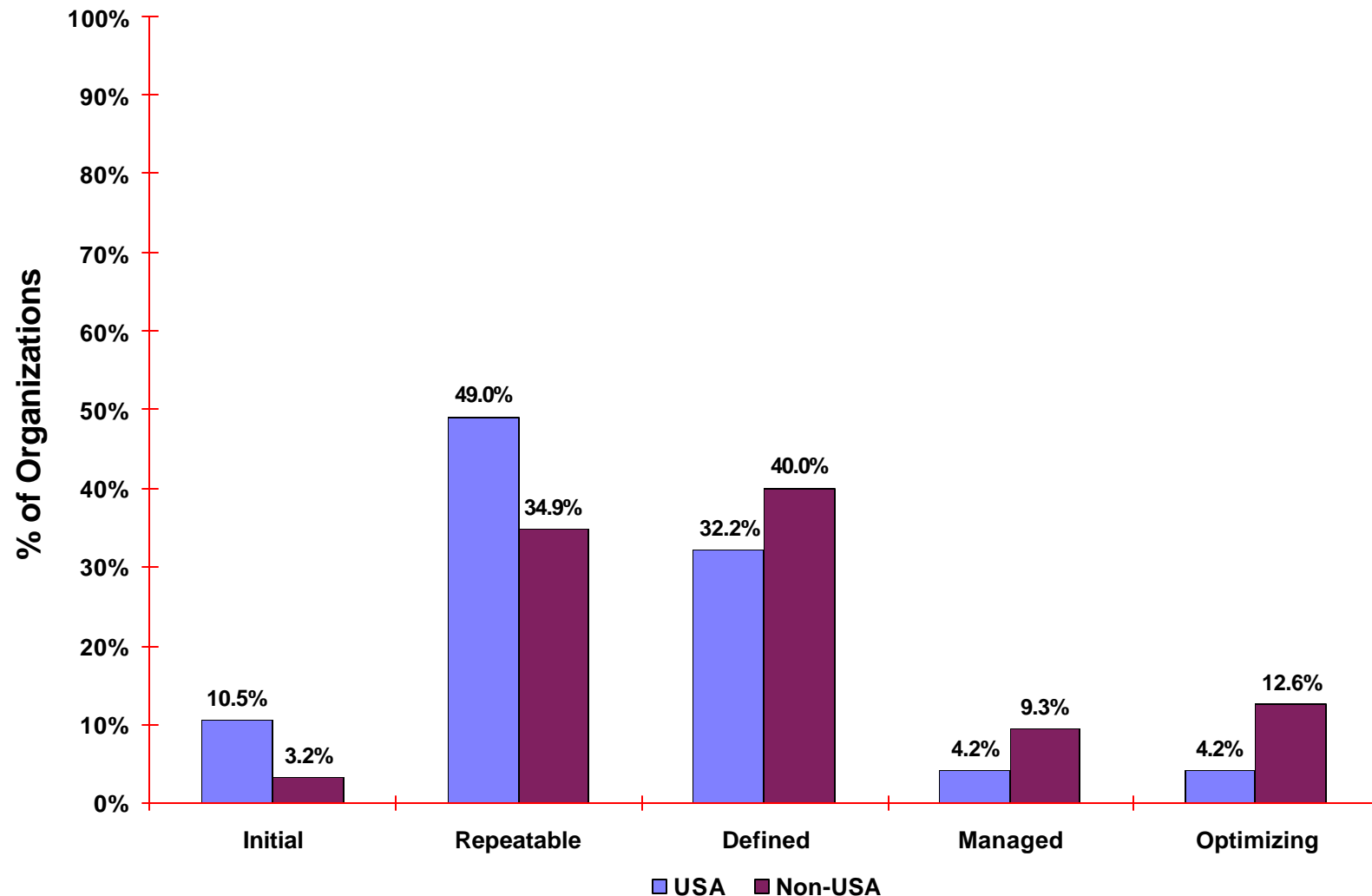
% of Organizations

	Initial	Repeatable	Defined	Managed	Optimizing
USA	10.5%	49.0%	32.2%	4.2%	4.2%
Non-USA	3.2%	34.9%	40.0%	9.3%	12.6%

■ USA ■ Non-USA

Based on **602** U.S. organizations and **1202** Non-USA organizations reporting categories and a maturity level rating

Section 2: Community Trends

**CBA IPIs , SPAs and SCAMPI v1.1 using the SW-CMM conducted since 1987 through December 2005 <u>and</u> reported to the SEI**

- **3,952   appraisals**
    - **3,330 CBA IPIs**
    - **484 SPAs**
    - **138 SCAMPIs**
- **3,049   organizations**
- **1,241   participating companies**
- **704   reappraised organizations**
- **16,540   projects**

Please refer to: Terms Used in this Report on page 30

Countries Where Appraisals have been Performed <u>and</u> Reported to the SEI
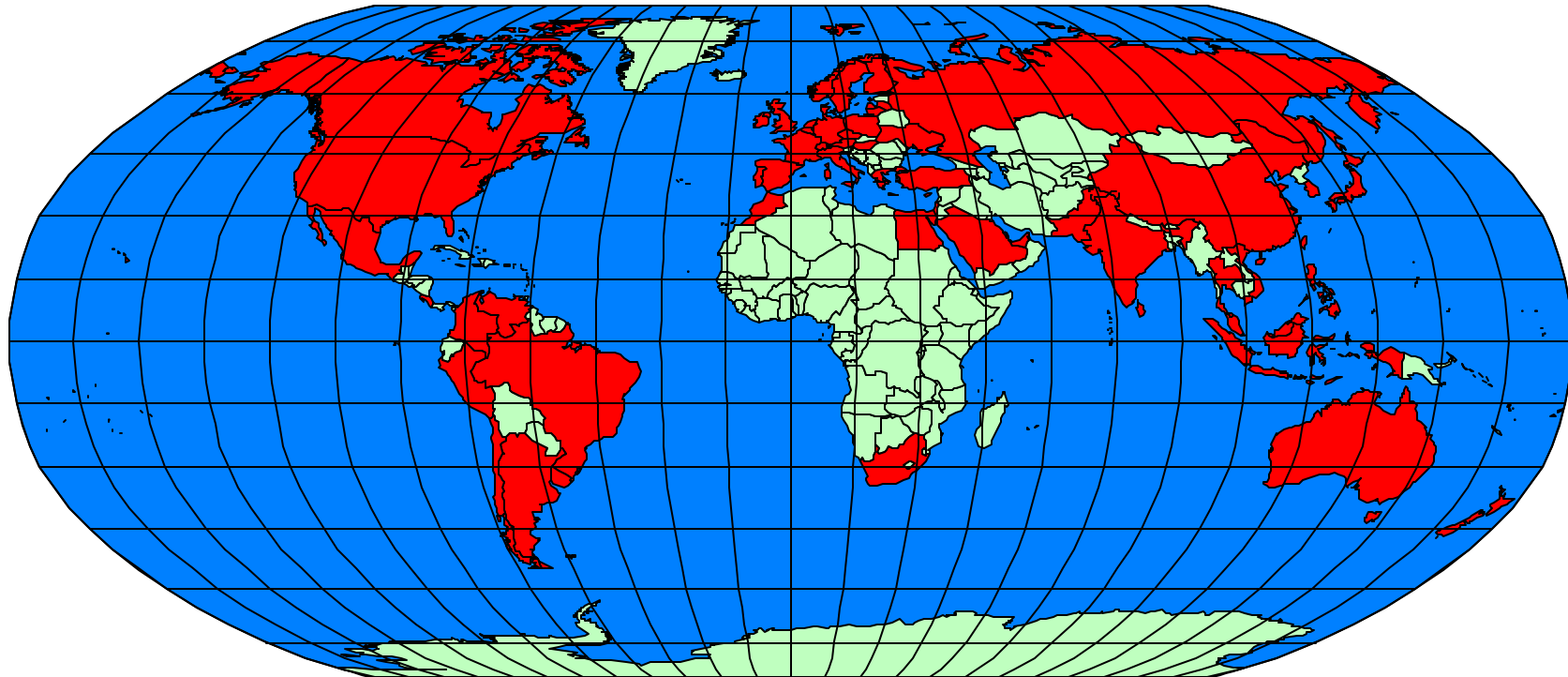
|						
Argentina	**Australia**	**Austria**	**Barbados**	**Belgium**	**Brazil**	**Canada**
Chile	**China**	**Colombia**	**Costa Rica**	**Cyprus**	**Czech Republic**	**Denmark**
Egypt	**Finland**	**France**	**Germany**	**Greece**	**Hong Kong**	**Hungary**
India	**Indonesia**	**Ireland**	**Israel**	**Italy**	**Japan**	**Korea, Republic of**
Latvia	**Lithuania**	**Malaysia**	**Mauritius**	**Mexico**	**Morocco**	**Netherlands**
New Zealand	**Norway**	**Pakistan**	**Peru**	**Philippines**	**Poland**	**Portugal**
Puerto Rico	**Russia**	**Saudi Arabia**	**Singapore**	**South Africa**	**Spain**	**Sri Lanka**
Sweden	**Switzerland**	**Taiwan**	**Thailand**	**Turkey**	**Ukraine**	**United Arab Emirates**
United Kingdom	**United States**	**Uruguay**	**Venezuela**	**Vietnam**		

Number of Appraisals and Maturity Levels Reported to the SEI by Country

Country	Number of Appraisals	Maturity Level 1 Reported	Maturity Level 2 Reported	Maturity Level 3 Reported	Maturity Level 4 Reported	Maturity Level 5 Reported
Argentina	12	No	Yes	Yes	No	Yes
Australia	36	Yes	Yes	Yes	No	Yes
Austria	10 or fewer					
Barbados	10 or fewer					
Belgium	17	Yes	Yes	Yes	No	No
Brazil	32	Yes	Yes	Yes	Yes	Yes
Canada	85	Yes	Yes	Yes	Yes	Yes
Chile	29	Yes	Yes	Yes	No	Yes
China	354	Yes	Yes	Yes	Yes	Yes
Colombia	10 or fewer					
Costa Rica	10 or fewer					
Cyprus	10 or fewer					
Czech Republic	10 or fewer					
Denmark	10 or fewer					
Egypt	10 or fewer					
Finland	10 or fewer					
France	151	Yes	Yes	Yes	Yes	Yes
Germany	76	Yes	Yes	Yes	Yes	No
Greece	10 or fewer					
Hong Kong	12	Yes	Yes	Yes	Yes	No
Hungary	10 or fewer					
India	422	Yes	Yes	Yes	Yes	Yes
Indonesia	10 or fewer					
Ireland	11	Yes	Yes	Yes	No	No
Israel	32	Yes	Yes	Yes	No	No
Italy	40	Yes	Yes	Yes	No	Yes
Japan	177	Yes	Yes	Yes	Yes	Yes
Korea, Republic of	78	Yes	Yes	Yes	Yes	Yes
Latvia	10 or fewer					
Lithuania	10 or fewer					
Malaysia	10 or fewer					

Country	Number of Appraisals	Maturity Level 1 Reported	Maturity Level 2 Reported	Maturity Level 3 Reported	Maturity Level 4 Reported	Maturity Level 5 Reported
Mauritius	10 or fewer					
Mexico	34	Yes	Yes	Yes	Yes	Yes
Morocco	10 or fewer					
Netherlands	25	Yes	Yes	Yes	No	Yes
New Zealand	10 or fewer					
Norway	10 or fewer					
Pakistan	10 or fewer					
Peru	10 or fewer					
Philippines	13	No	Yes	Yes	No	Yes
Poland	10 or fewer					
Portugal	10 or fewer					
Puerto Rico	10 or fewer					
Russia	10 or fewer					
Saudi Arabia	10 or fewer					
Singapore	23	Yes	Yes	Yes	No	Yes
South Africa	10 or fewer					
Spain	28	No	Yes	Yes	Yes	Yes
Sri Lanka	10 or fewer					
Sweden	10 or fewer					
Switzerland	10 or fewer					
Taiwan	10 or fewer					
Thailand	23	Yes	Yes	Yes	No	No
Turkey	10 or fewer					
Ukraine	10 or fewer					
United Arab Emirates	10 or fewer					
United Kingdom	144	Yes	Yes	Yes	No	No
United States	2035	Yes	Yes	Yes	Yes	Yes
Uruguay	10 or fewer					
Venezuela	10 or fewer					
Vietnam	10 or fewer					

The organization maturity profile, page 6, can be created for certain countries using the Interactive Maturity Profile available in the Software Engineering Information Repository Web site. Please visit: http://seir.sei.cmu.edu. If you are not already a member of the SEIR web site, please register to join. Registration and use of the site are free.
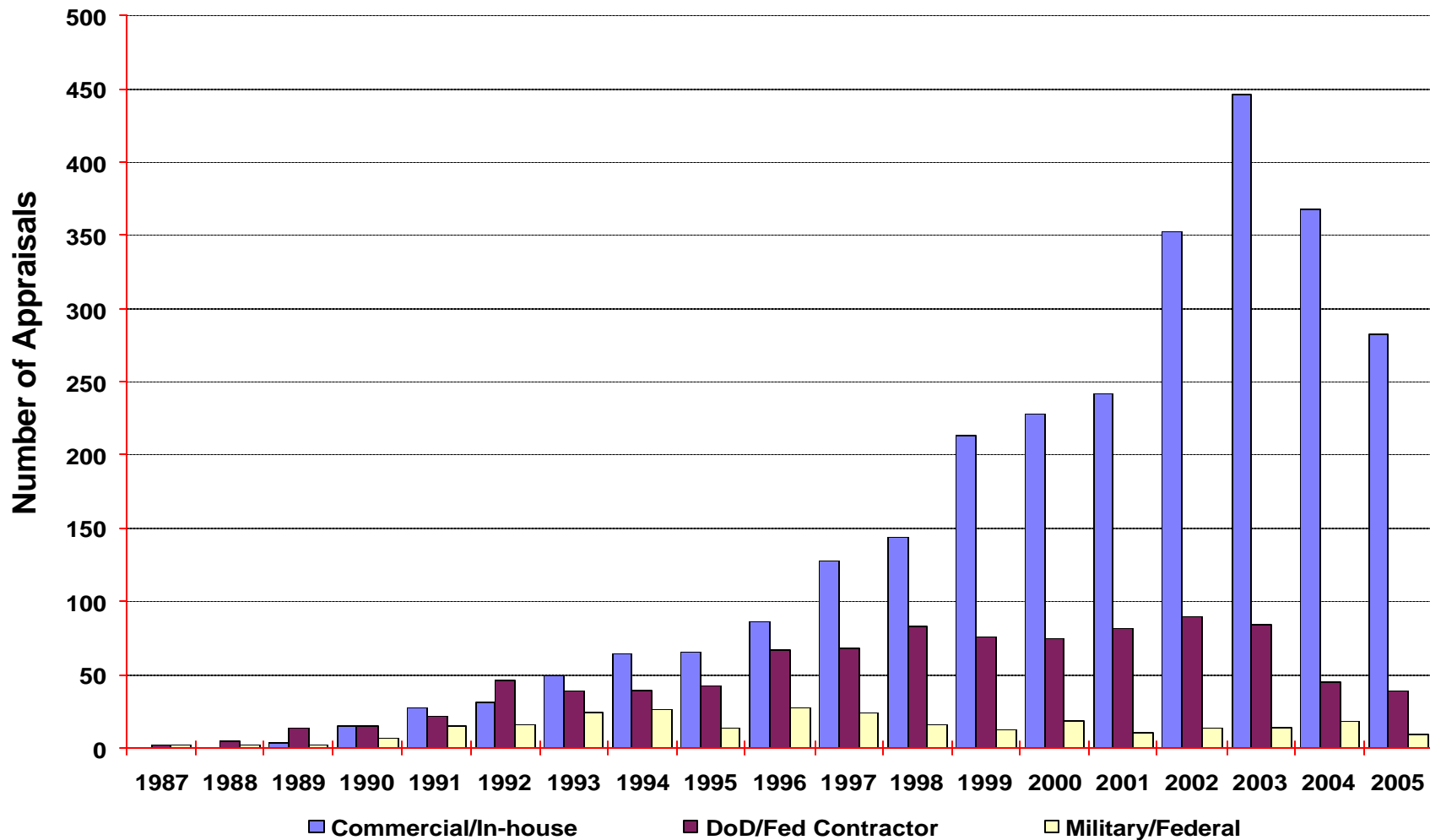
Number of SW-CMM Appraisals Reported to the SEI by Year
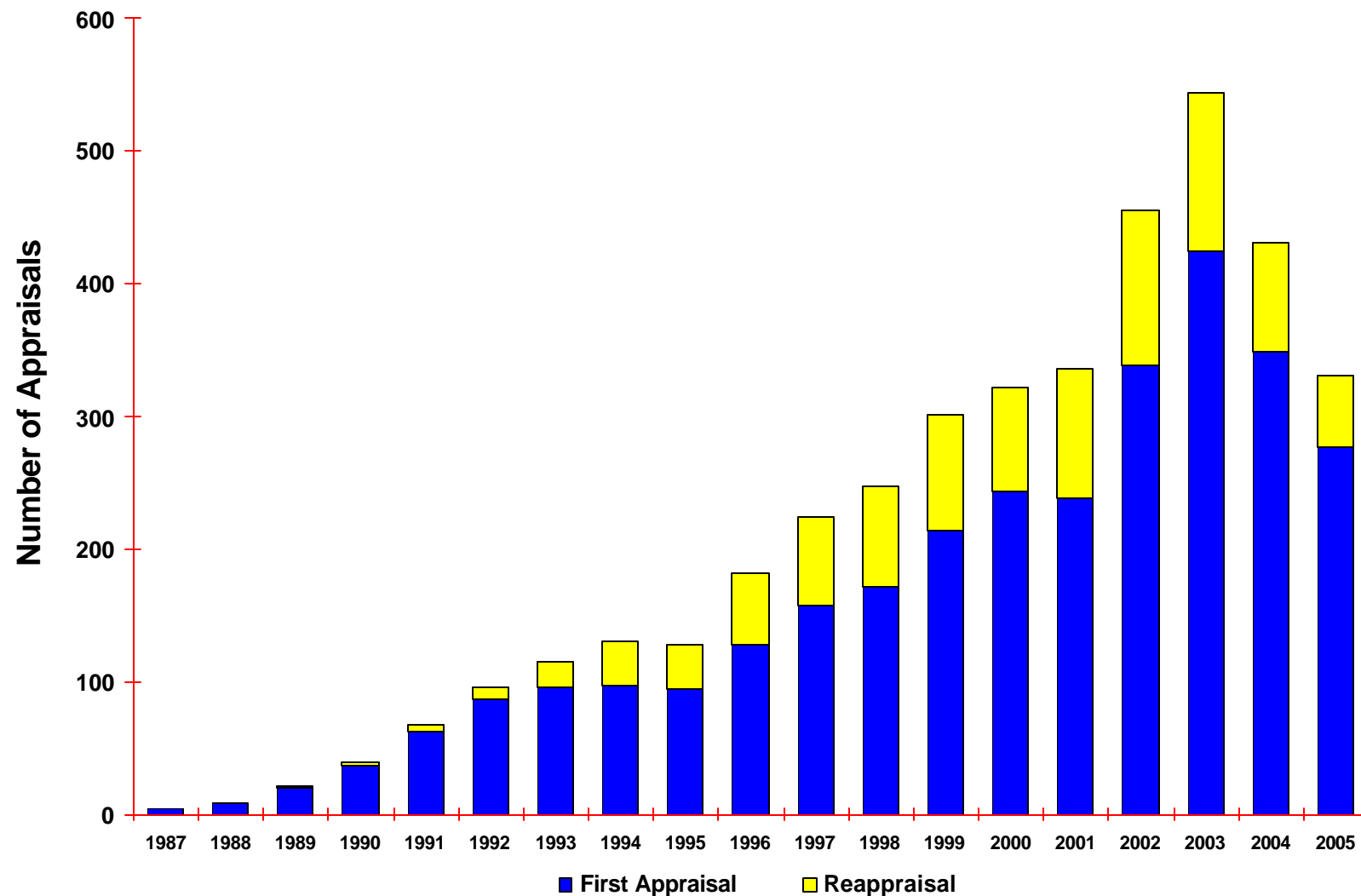
Based on **3,952** appraisals conducted through **Dec 2005** and reported to the SEI
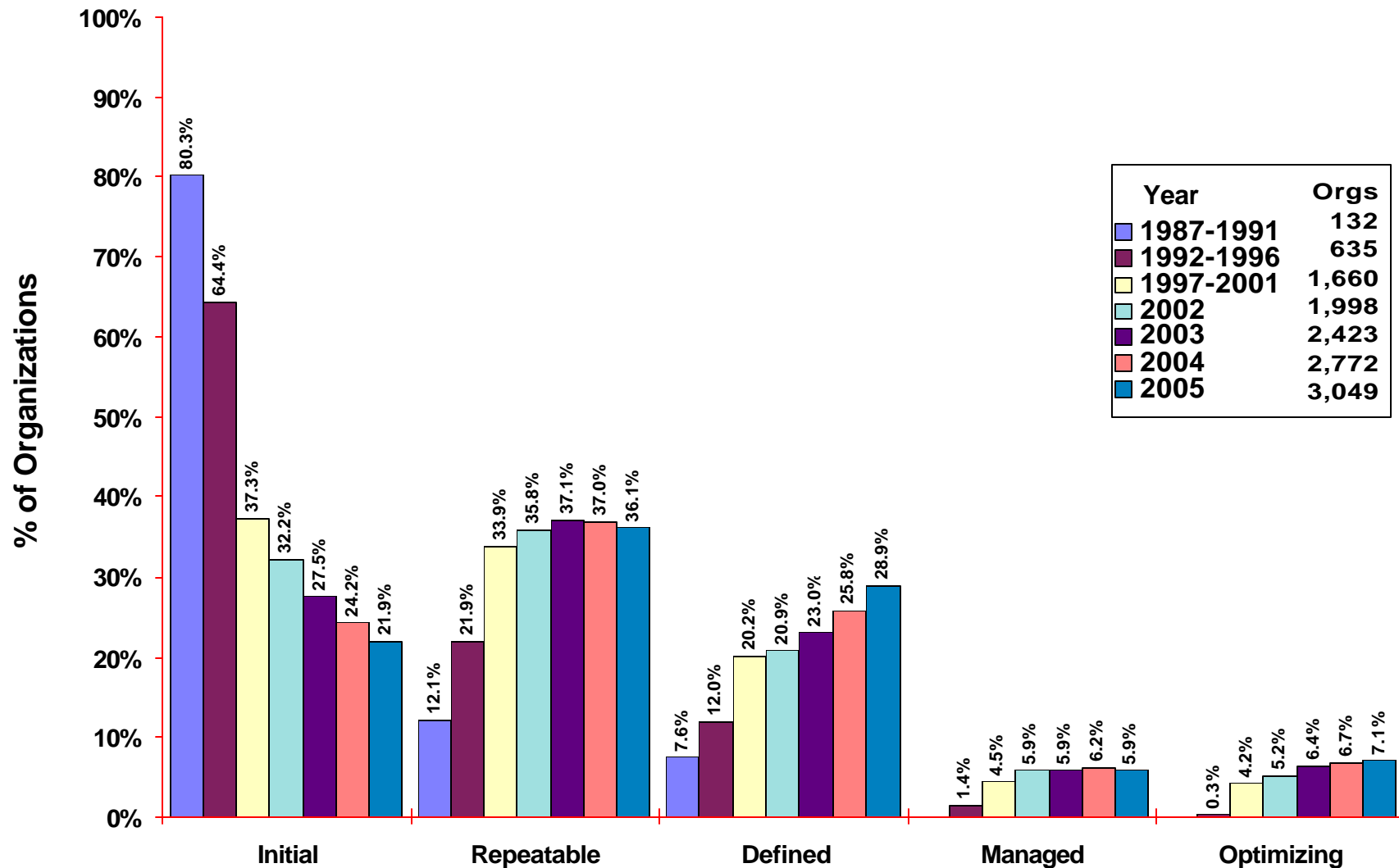
Number of SW-CMM Appraisals Reported to the SEI by Organization Categories and Year

Based on **3,950** appraisals reporting organization categories

Trends in the Community Maturity Profile

Year	Orgs
1987-1991	132
1992-1996	635
1997-2001	1,660
2002	1,998
2003	2,423
2004	2,772
2005	3,049

Based on a cumulative view of the most recent appraisals of organizations up through the year indicated.
This accounts for the difference from the figures on page 5.

Section 3: Organizational Trends

Appraisals conducted through December 2005 and reported to the SEI
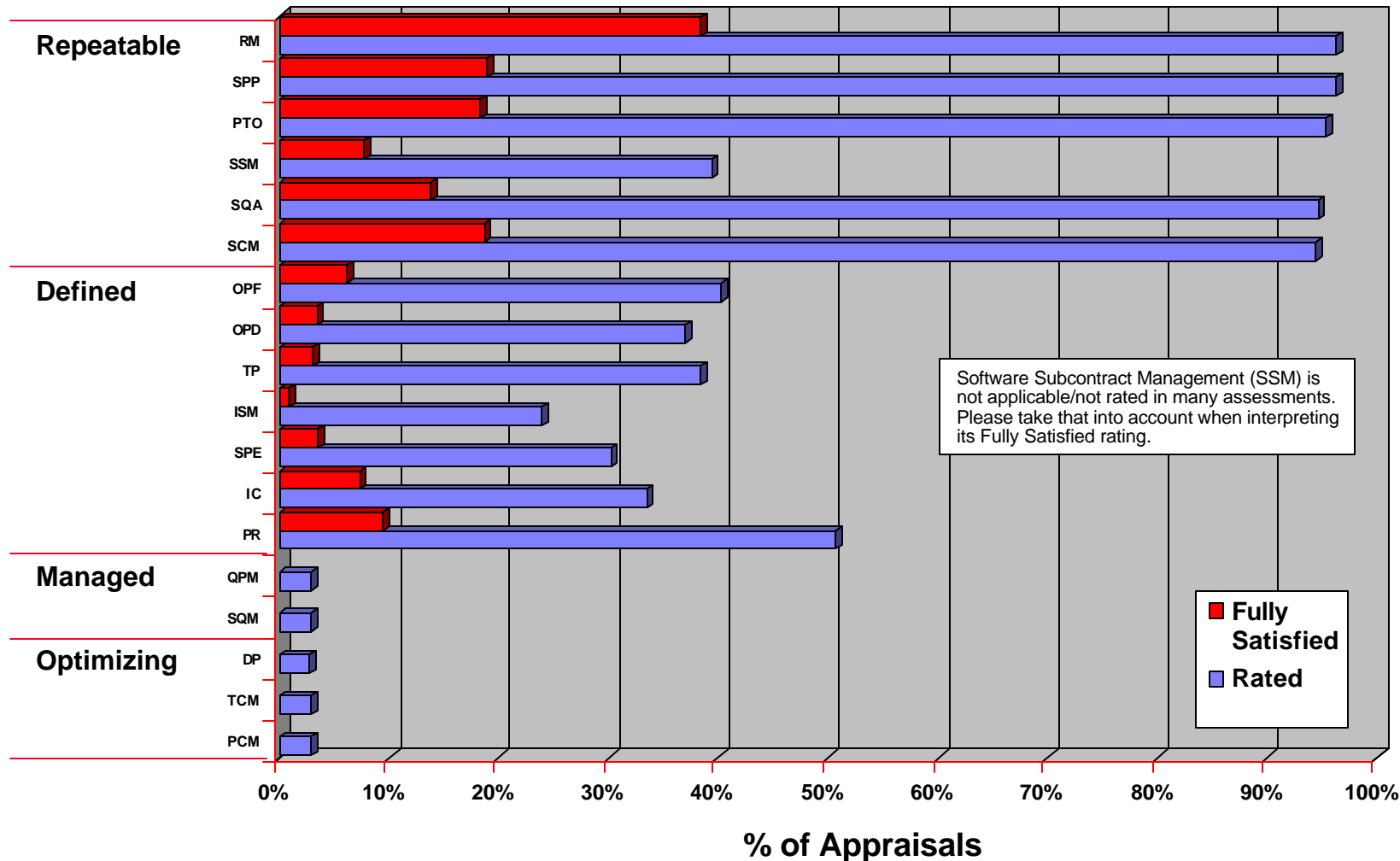
- **1,956 Key Process Area (KPA) profiles**
  - satisfaction of KPAs by maturity level for organizations appraised at levels 1 and 2

- **704 reappraised organizations**
  - accounting for 1,617 appraisals
  - although some organizations conducted multiple reappraisals, only the first and latest appraisals were used in creating the charts on pages 23 & 24

Please refer to: Terms Used in this Report on page 30

Key Process Area Profiles - 1
Organizations Appraised at Level 1

Repeatable — RM, SPP, PTO, SSM, SQA, SCM

Defined — OPF, OPD, TP, ISM, SPE, IC, PR

Managed — QPM, SQM

Optimizing — DP, TCM, PCM

Software Subcontract Management (SSM) is not applicable/not rated in many assessments. Please take that into account when interpreting its Fully Satisfied rating.

- Fully Satisfied
- Rated

% of Appraisals

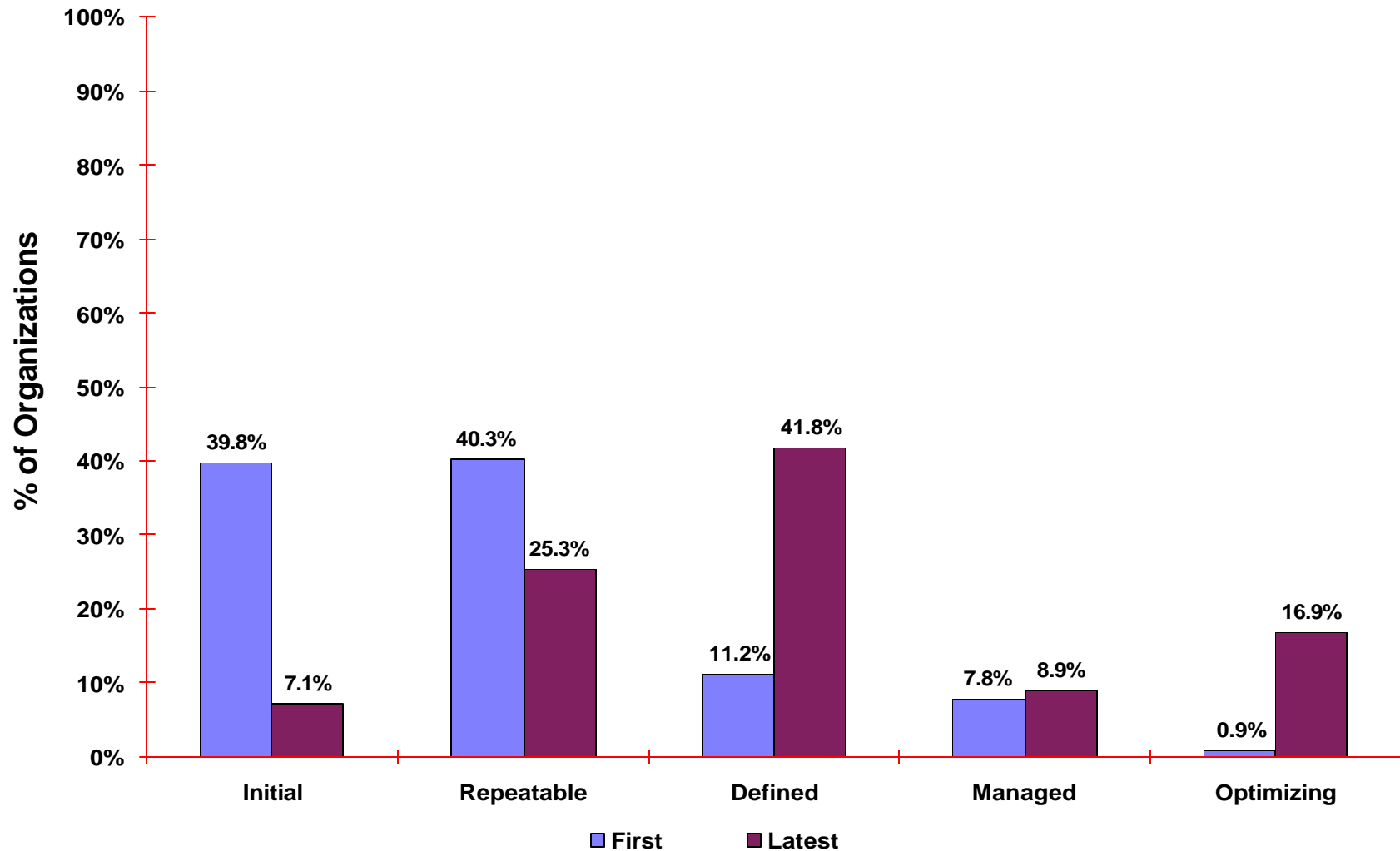Based on **582** CBA IPI and SCAMPI with SW-CMM appraisals reporting a maturity level rating

Key Process Area Profiles - 2 Organizations Appraised at Level 2
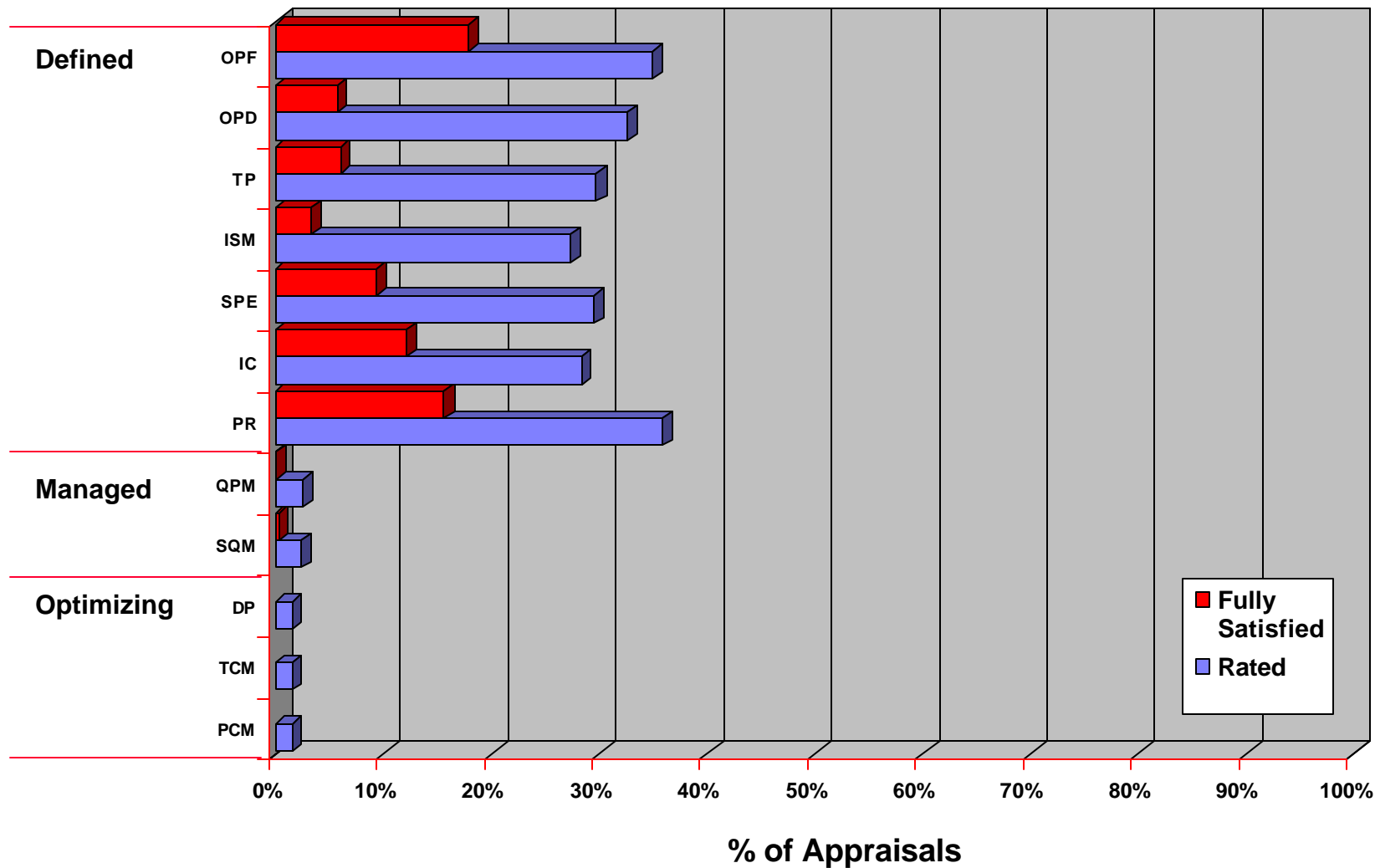
Based on **1374** CBA IPI and SCAMPI With SW-CMM appraisals reporting a maturity level rating

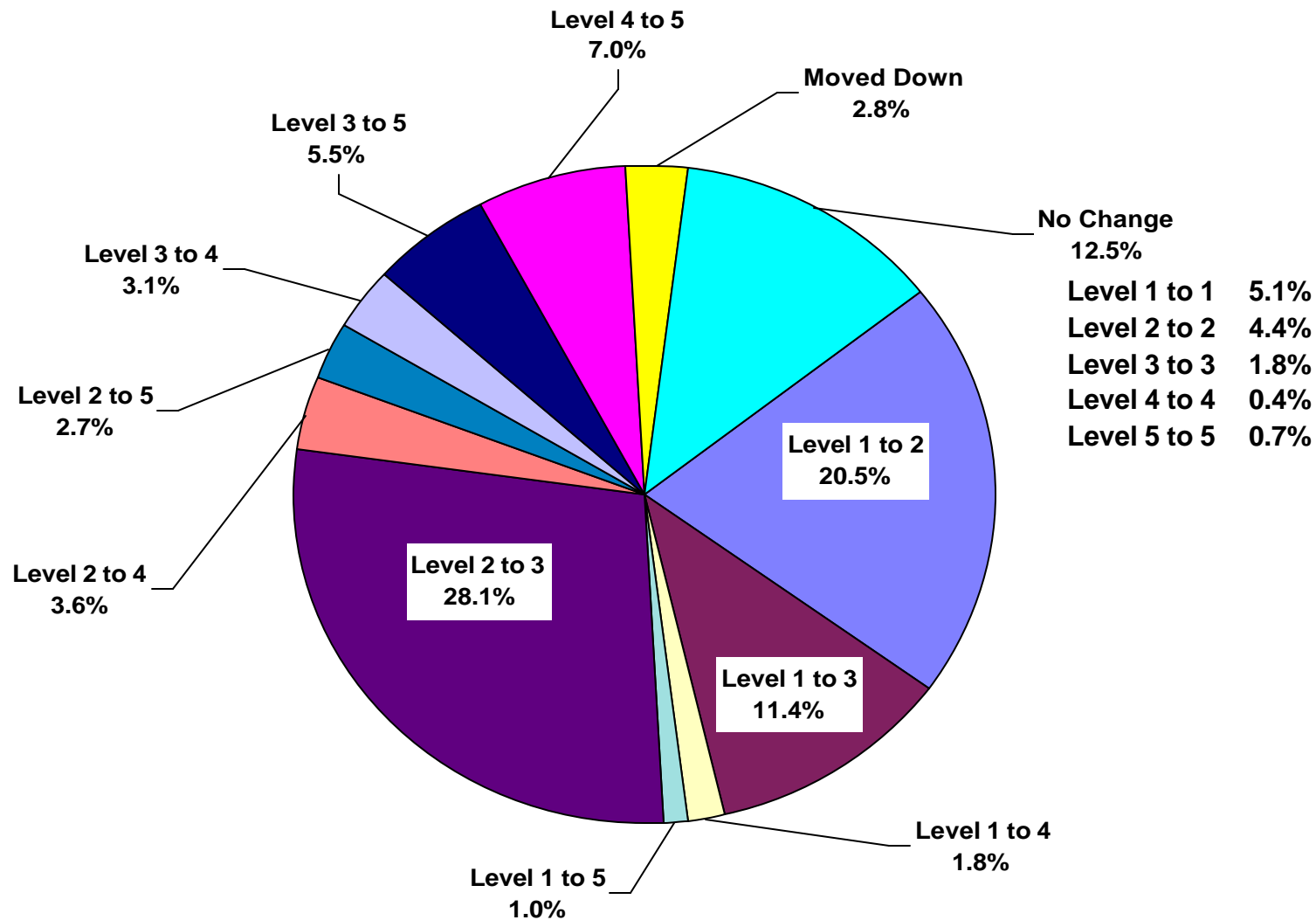# Maturity Level of
First and Latest Appraisal

Based on **704** reappraised organizations using their first and latest appraisal
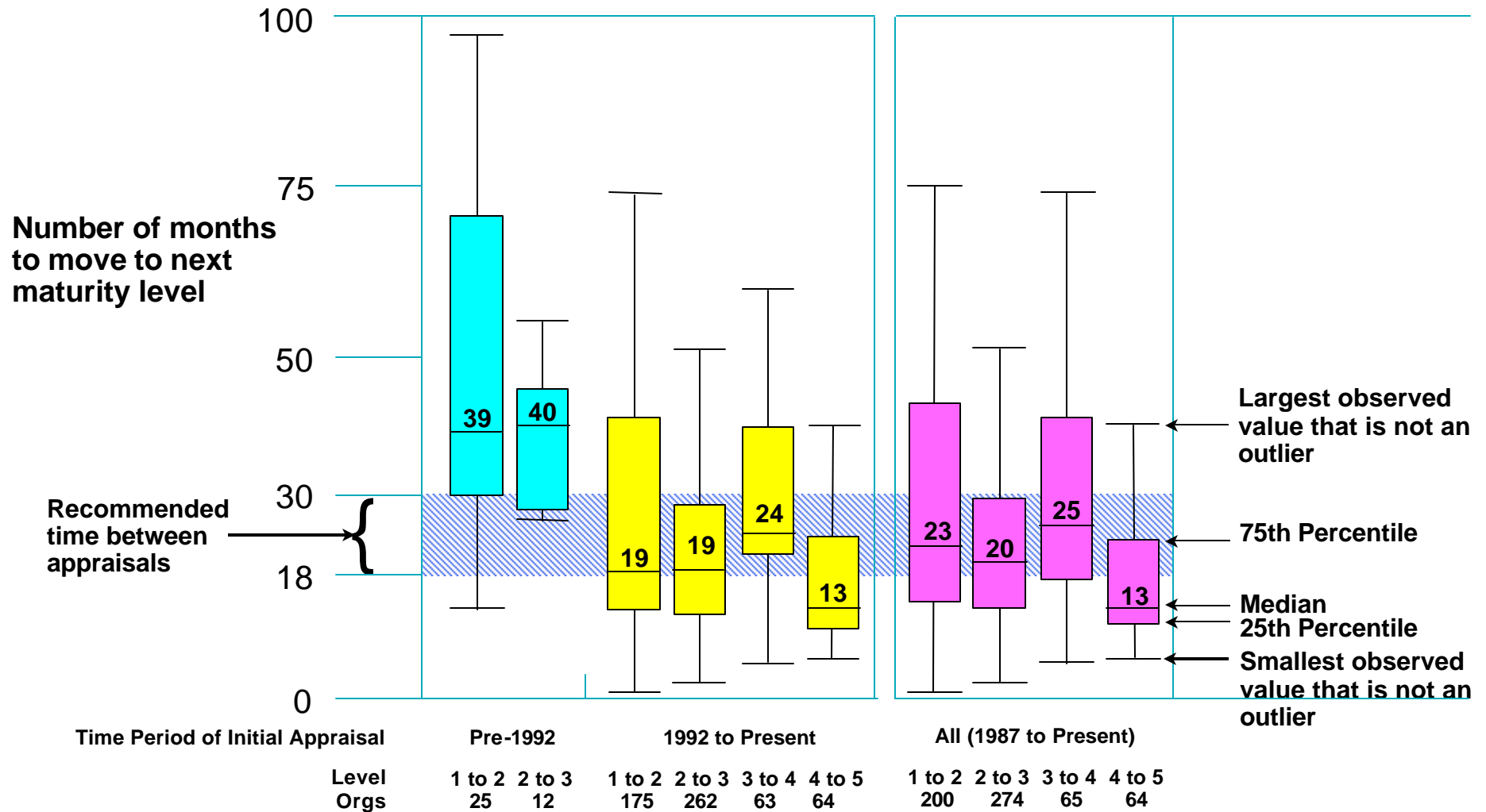
Reappraisals
Change in Maturity Level

Based on **704** reappraised organizations using their first and latest appraisal

Time to Move Up

Number of months to move to next maturity level

Recommended time between appraisals

Largest observed value that is not an outlier

75th Percentile

Median
25th Percentile

Smallest observed value that is not an outlier

Time Period of Initial Appraisal

	Pre-1992	1992 to Present	All (1987 to Present)

Level 1 to 2 2 to 3   1 to 2 2 to 3 3 to 4 4 to 5   1 to 2 2 to 3 3 to 4 4 to 5
Orgs   25   12   175   262   63   64   200   274   65   64

Summary of Current Status

Commercial and in-house organizations reported most appraisals

Of U.S. organizations, the services and manufacturing industries reported most appraisals

Over half of the organizations reporting size have 100 or fewer software personnel

More Non-USA appraisals reported than U.S. in this 5 year snapshot

Summary of Organizational Trends - 1

The number of SW-CMM appraisals steadily declined during the two years sunset period (2004-2005) while CMMI SCAMPI appraisals have been rapidly increased (See Process Maturity Profile for CMMI V1.1)

NO SW-CMM appraisals have been reported since Dec. 2005

Software Subcontract Management is the least frequently satisfied level 2 KPA among organizations appraised at level 1

Integrated Software Management is the least frequently satisfied level 3 KPA among organizations appraised at level 2

Higher maturity has been reached among those organizations reporting reappraisals

Summary of Organizational Trends (continued) - 2

For organizations that began their CMM-based SPI effort in 1992 or later, the median time to move from:

- **maturity level 1 to 2 is 19 months**
- **maturity level 2 to 3 is 19 months**
- **maturity level 3 to 4 is 24 months**
- **maturity level 4 to 5 is 13 months**

Note:

Since the September 2005 report, the median time to move from maturity level 2 to 3 dropped from 20 month to 19 month and the median time to move from maturity level 3 to 4 dropped from 25 month to 24 month.

Terms Used in this Report

Appraisal   - The appraisal methods used in this report are the Software Process Assessment (SPA), CMM-Based Appraisal for both Internal Process Improvement (CBA IPI) and Standard CMMI® Appraisal Method for Process Improvement (SCAMPI). We do request and receive other Software CMM-based appraisals such as Software Capability Evaluations (SCE) and Interim Profiles. As our sampling size of these other methods increase, they will be reported here.

Company   - Parent of the appraised entity
A company can be a commercial or non-commercial firm, for-profit or not for-profit business, a research and development unit, a higher education unit, a government agency, or branch of service, etc.

Organization - a.k.a. Appraised entity
The organization unit to which the appraisal results apply. An appraised entity can be the entire company, a selected business unit, units supporting a particular product line or service, etc.

Non-USA   - Appraised entity whose geographic location is not within the United States. The parent of the appraised entity may or may not be based within the United States.

Contact Information

Please visit:

http://www.sei.cmu.edu/appraisal-program/profile/about.html

and review the information provided before contacting:

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